

WHAT IS CLAIMED IS:

1. A fabrication method of a non-volatile memory device comprising:
forming a floating gate over a semiconductor substrate, the floating gate having a first portion and a second portion;
forming an intermediate insulator over the first portion of the floating gate, the second portion of the floating gate not covered by the insulator
forming a control gate over the intermediate insulator, the second portion of the floating gate not covered by the control gate;
forming sidewall spacers on both sides of the floating gate and the control gate;
forming a tunneling insulator on a surface of the second portion of the floating gate, causing a tapered protrusion to form on the second portion of the floating gate under the tunneling insulator; and
forming an erasing gate on the tunneling insulator and above the tapered protrusion of the floating gate.
2. The method of claim 1, wherein the tunneling insulator is formed by performing an oxidation process over the semiconductor substrate using the sidewall spacers as a mask.
3. The method of claim 1, wherein the intermediate insulator is formed by using at least one of a silicon oxide film, a LPCVD oxide film and a silicon nitride film.

4. The method of claim 1, wherein the intermediate insulator is formed to a thickness of 100~500Å.

5. The method of claim 1, wherein said step of forming the floating gate comprises:

forming a lower floating gate portion over the semiconductor substrate;

forming an insulation film on the lower floating gate portion, the insulation film having a contact hole to expose a predetermined portion of the lower floating gate portion; and

forming an upper floating gate portion on the insulation film and in the contact hole, the upper and lower floating gate portions being electrically connected via the contact hole.

6. The method of claim 1, wherein said step of forming the sidewall spacers comprises:

sequentially forming a nitride film and an oxide film over an entire surface of the semiconductor substrate including the control gate and the floating gate; and

performing an etch back process on the oxide film and the nitride film so that portions of the oxide film and the nitride film remain on both sides of the control gate and floating gate.

7. The method of claim 1, wherein the tapered protrusion of the floating gate is formed to point towards the erasing gate.

8. A method of forming a non-volatile memory device comprising:

forming a floating gate above the substrate, the floating gate having a first end and a second end, the second end having a tapered portion;

forming a control gate above the first end of the floating gate, the control gate having a first end and a second end;

forming a cap insulator above the control gate, the cap insulator having a first end and a second end;

forming a first sidewall spacer abutting the first end of the floating gate, the first end of the control gate and the first end of the cap insulator;

forming a second sidewall spacer abutting the first end of the floating gate, the second end of the control gate and the second end of the cap insulator;

forming a third sidewall spacer abutting the second end of the floating gate;

forming a tunneling insulator on a surface of the second end of the floating gate, the tunneling insulator being between the second and third sidewall spacers; and

forming an erasing gate above the tunneling insulator and the second end of the floating gate.

9. The method of claim 8, wherein the first, second and third sidewall spacers are each formed to comprise an inner portion abutting the floating gate, the control gate or the cap insulator, wherein the inner portion being formed of an oxidation resist insulator.

10. The method of claim 9, wherein the first, second and third sidewall spacers are each formed to comprise an outer portion adjacent the inner portion, the outer portion being formed of an oxide insulator.

11. The method of claim 8, wherein the tunneling insulator is formed to have a first end and a second end, the first and second ends being tapered.